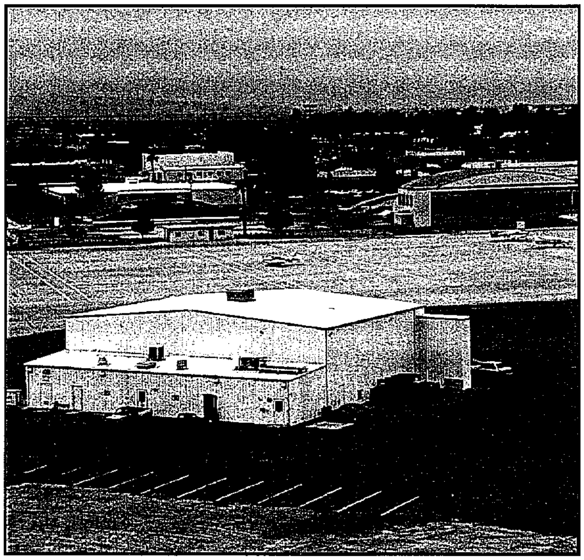
WILLIAMS
GATEWAY
AIRPORT

Chapter Three
FACILITY REQUIREMENTS

Chapter Three
FACILITY REQUIREMENTS



To properly plan for the future of Williams Gateway Airport, it is necessary to translate forecast aviation demand into the specific types and quantities of facilities that can adequately serve this identified demand. This chapter uses the results of the forecasts conducted in Chapter Two, as well as established planning criteria, to determine the airfield (i.e., runways, taxiways, navigational aids, marking and lighting), and landside (i.e., hangars, terminal building, cargo buildings, aircraft parking apron) facility requirements.

The objective of this effort is to identify, in general terms, the adequacy of the existing airport facilities, outline what new facilities may be needed, and when these may be needed to accommodate forecast demands. Having established these facility requirements, alternatives for providing these facilities will be evaluated in Chapter Four to determine the most cost-effective and efficient means for implementation.

Recognizing that the need to develop facilities is determined by demand, rather than a point in time, the requirements for new facilities have been expressed for the short, intermediate, and long term planning horizons, which roughly correlate to five-year, ten-year, and twenty-year time frames. Future facility needs will be related to these activity levels rather than a specific year. **Table 3A** summarizes the activity levels that define the planning horizons used in the remainder of this master plan.

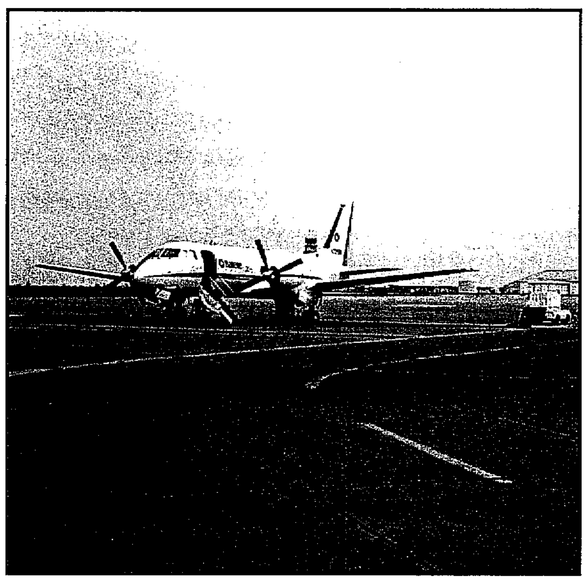


TABLE 3A Planning Horizon Activity Levels	Short Term Planning Horizon	Intermediate Term Planning Horizon	Long Term Planning Horizon
Passenger Enplanements	250,000	650,000	2,000,000
Enplaned Air Cargo (pounds)	12,340,000	16,450,000	24,670,000
Based Aircraft	100	135	210
Annual Operations	232,400	261,500	338,200

AIRFIELD REQUIREMENTS

Airfield requirements include the need for those facilities related to the arrival and departure of aircraft. These facilities are comprised of the following items:

- Runways
- Taxiways
- Navigational Aids
- Airfield Marking and Lighting

The following airfield facilities are outlined to describe the scope of facilities that would be necessary to accommodate the airport's role throughout the planning period.

AIRFIELD DESIGN STANDARDS

The selection of appropriate FAA design standards for the development and location of airport facilities is based primarily upon the characteristics of the aircraft which are currently using, or are expected to use the airport. Planning for future aircraft use is of particular importance since design standards are used to plan separation distances between facilities. These standards must be determined now since the relocation of these facilities will likely be extremely expensive at a later date.

The FAA has established a coding system to relate airport design criteria to the operational and physical characteristics of aircraft expected to use the airport. This code, the airport reference code (ARC), has two components: the first component, depicted by a letter, is the aircraft approach category and relates to aircraft approach speed (operational characteristic); the second component, depicted by a Roman numeral, is the airplane design group and relates to aircraft wingspan (physical characteristic). Generally, aircraft approach speed applies to runways and runway-related facilities, while airplane wingspan primarily relates to separation criteria involving taxiways, taxilanes, and landside facilities.

According to FAA Advisory Circular (AC) 150/5300-13, *Airport Design*, an aircraft's approach category is based upon 1.3 times its stall speed in landing configuration at that aircraft's maximum certificated weight. The five approach categories used in airport planning are as follows:

Category A: Speed less than 91 knots.

Category B: Speed 91 knots or more, but less than 121 knots.

Category C: Speed 121 knots or more, but less than 141 knots.

Category D: Speed 141 knots or more, but less than 166 knots.

Category E: Speed greater than 166 knots.

The airplane design group (ADG) is based upon the aircraft's wingspan. The six ADG's used in airport planning are as follows:

Group I: Up to but not including 49 feet.

Group II: 49 feet up to but not including 79 feet.

Group III: 79 feet up to but not including 118 feet.

Group IV: 118 feet up to but not including 171 feet.

Group V: 171 feet up to but not including 214 feet.

Group VI: 214 feet or greater.

In order to determine facility requirements, an ARC should first be determined, then appropriate airport design criteria can be applied. This begins with a review of the type of aircraft using and expected to use Williams Gateway Airport. **Exhibit 3A** summarizes representative aircraft by ARC.

Williams Gateway Airport currently accommodates a wide-variety of civilian and military aircraft use. Aircraft using the airport include small single and multi-engine aircraft (which fall within approach categories A and B and airplane design group I) and business turboprop, and jet aircraft (which fall within approach categories B, C, and D and airplane design group II). The airport is also used by large transport aircraft (such as DC-9 and 727 aircraft) for transporting cargo and for official duties of the U.S. immigration services. These aircraft fall within approach category C and airplane design groups III and IV.

Military aircraft using the airport range from helicopters and fighter aircraft to large refueling aircraft. The largest military aircraft using the airport on a regular basis are KC-135 aircraft from Phoenix Sky Harbor Airport which fall within ARC C-IV.

The airport also accommodates aircraft for certification activities ranging from commercial turboprop aircraft to large transport aircraft such as the Boeing 777 (ARC D-V) and presently the MD-10 (a conversion of older DC-10 aircraft) which falls within ARC D-IV.

America West Airlines and Southwest Airlines use Williams Gateway Airport for training and certification. Typically this involves the use of Boeing 737 and 757 aircraft and Airbus A320 aircraft. These aircraft fall within ARCs C-III and C-IV.

The future civilian fleet mix is expected to include a greater number of aircraft operations by large transport aircraft such as the McDonnell-Douglas DC-9 and DC-10 and Boeing 737 and 727 aircraft providing air cargo and passenger service. Future cargo activities could potentially include Boeing 747 aircraft which fall within ARC D-V. The airport is also expected to serve a growing number of business jet operations.

Large transport aircraft are the critical aircraft for defining airfield design standards. The previous Master Plan included a recommendation to plan airfield elements to ARC D-V standards. Considering the existing and future fleet mix, airfield elements should continue to follow ARC D-V design standards. ARC D-V accommodates the approach speed requirements of business jet and large transport aircraft and the wingspan requirements of large transport aircraft.

The design of taxiway and apron areas should consider the wingspan requirements of the most demanding aircraft to operate within that specific functional area on the airport. The terminal area should consider ADG IV requirements to accommodate typical transport jet aircraft. General aviation areas should consider ADG II requirements to accommodate the full range of business jet aircraft. Future air cargo facilities should follow ADG V design standards to accommodate large cargo aircraft.

RUNWAYS

The adequacy of the existing runway system at Williams Gateway Airport has been analyzed from a number of perspectives, including airfield capacity, runway orientation, runway length, and pavement strength. From this information, requirements for runway improvements have been determined for the airport.

AIRFIELD CAPACITY

An airport's airfield capacity is expressed in terms of its annual service volume. Annual service volume is a reasonable estimate of the maximum level of aircraft operations that can be accommodated in a year. Annual service volume accounts for annual differences in runway use, aircraft mix, and weather conditions. The airport's annual service volume was examined utilizing Federal Aviation Administration (FAA) Advisory Circular (AC) *150/5060-5, Airport Capacity and Delay*.

Factors Affecting Annual Service Volume

Exhibit 3B graphically presents the various factors included in the calculation of an airport's annual service volume. These include: the airfield characteristics, meteorological conditions, aircraft mix, and demand characteristics (aircraft operations). These factors are described below.

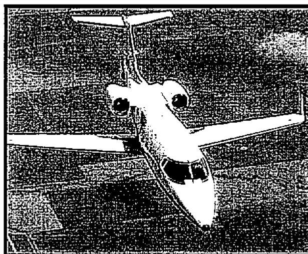
Airfield Characteristics

The layout of the runways and taxiways directly affects an airfield's capacity. This not only includes the location and orientation of the runways, but the

98MP03-3A-9/24/98

A-I

Beech Baron 55
Beech Bonanza
Cessna 150
Cessna 172
Piper Archer
Piper Seneca



C-I, D-I

Lear 25, 35, **55**
Israeli Westwind
HS 125

B-I
less than 12,500 lbs.

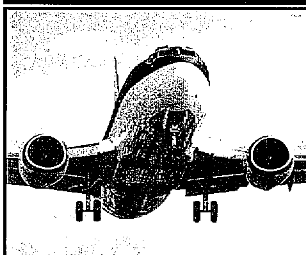
Beech Baron 58
Beech King Air 100
Cessna 402
Cessna 421
Piper Navajo
Piper Cheyenne
Swearingen Metroliner
Cessna Citation I

C-II, D-II

Gulfstream II, **III**, IV
Canadair 600
Canadair Regional Jet
Lockheed JetStar

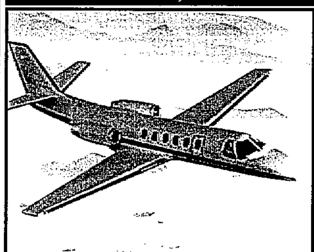
B-II
less than 12,500 lbs.

Super King Air 200
Cessna 441
DHC Twin Otter



C-III, D-III

B 727-200
B 737-200
B 737-300, 400, 500
DC-9
Fokker 70, 100
MD-80
A320



B-I, II
over 12,500 lbs.

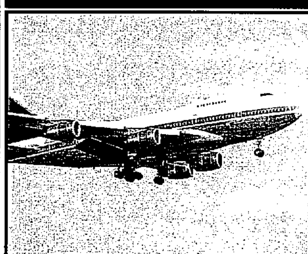
Super King Air 300
Beech 1900
Jetstream 31
Falcon 10, 20, 50
Falcon 200, 900
Citation II, III, IV, V
Saab 340
Embraer 120

C-IV, D-IV

B-757
B-767
DC-8-70
DC-10
MD-11
L1011

A-III, B-III

DHC Dash 7
DHC Dash 8
DC-3
Convair 580
Fairchild F-27
ATR 72
ATP



D-V

B-747 Series
B-777

Note: Aircraft pictured is identified in bold type.

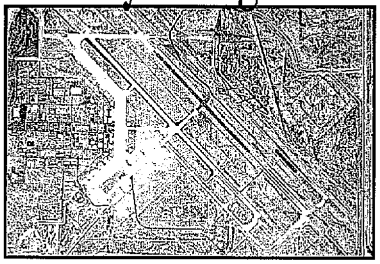
WILLIAMS GATEWAY AIRPORT

Exhibit 3A
AIRPORT REFERENCE CODES

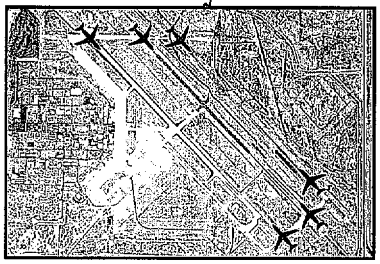
98MP03-3B-9/24/98

AIRFIELD LAYOUT

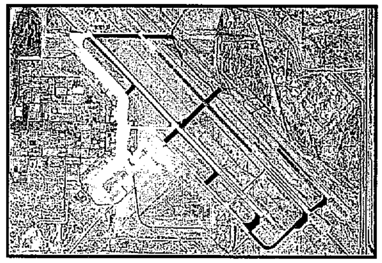
Runway Configuration



Runway Use

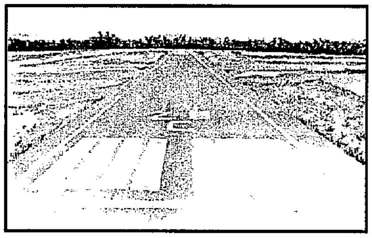


Number of Exits

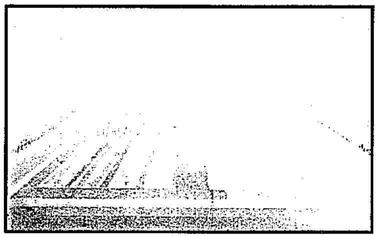


WEATHER CONDITIONS

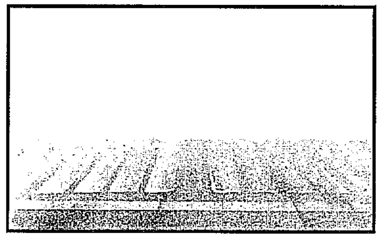
VFR



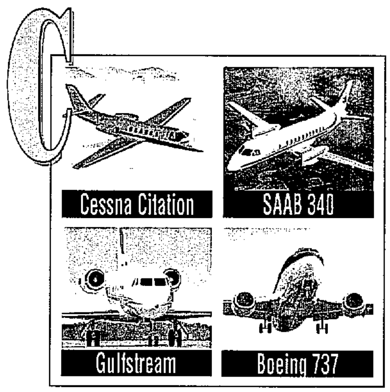
IFR

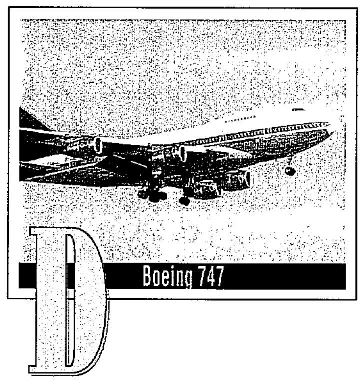


PVC



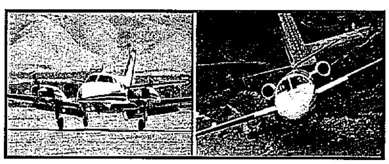
AIRCRAFT MIX



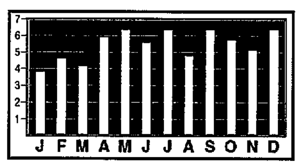


OPERATIONS

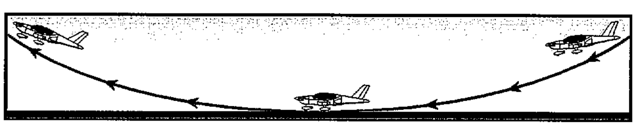
Arrivals and Departures



Total Annual Operations



Touch-and-Go Operations



WILLIAMS GATEWAY AIRPORT

Exhibit 3B
FACTORS INFLUENCING
ANNUAL SERVICE VOLUME

percent of time that a particular runway or combination of runways is in use and the length, width, weight bearing capacity, and instrument approach capability of each runway at the airport. The length, width, weight bearing capacity, and instrument approaches available to a runway determine which type of aircraft may operate on the runway and if operations can occur during poor weather conditions.

- **Runway Configuration**

The existing runway configuration consists of three parallel runways oriented in a northwest-southeast direction. Instrument approaches are available only to Runway 30C. This reduces airfield capacity since only a single runway is available for use during low visibility conditions. The existing parallel runway configuration provides for maximum capacity by providing for simultaneous operations to different runways during visual conditions.

- **Runway Use**

Runway use is normally dictated by wind conditions. The direction of take-offs and landings is generally determined by the speed and direction of wind. It is generally safest for aircraft to takeoff and land into the wind, avoiding a crosswind (wind that is blowing perpendicular to the travel of the aircraft) or tailwind components during these operations. Prevailing winds are from the west leading to greater use of Runways 30L, 30C, and 30R. For the capacity analysis, a single runway was assumed during low visibility and cloud ceiling situations (2 percent of the time). Depending on the scenario, either two or three runways were assumed to be available during VFR conditions (98 percent of the time). Since the runways are parallel, a differentiation is not needed between west flows and east flows of traffic for the capacity analysis.

- **Exit Taxiways**

Exit taxiways have a significant impact on airfield capacity since the number and location of exits directly determines the occupancy time of an aircraft on the runway. Three entrance/exit taxiways are available for use along Runways 12L-30R and 12C-30C, while five entrance/exit taxiways are available along Runway 12R-30L. The airfield capacity analysis gives credit to exits located within a prescribed range from a runway's threshold. This range is based upon the mix index of the aircraft that use the runway. The exits must be at least 750 feet apart to count as separate exits. Under this criteria, Runways 12L-30R and 12C-30C are credited with three exits, while Runway 12R-30L is credited with five exits.

Meteorological Conditions

Weather conditions can have a significant affect on airfield capacity. Airport capacity is usually highest in clear weather, when flight visibility is at its best. Airfield capacity is diminished as weather conditions deteriorate and cloud ceilings and visibility are reduced. As weather conditions deteriorate, the spacing of aircraft must increase to provide allowable margins of safety. The increased distance between aircraft reduces the number of aircraft which can operate at the airport during any given period. This consequently reduces overall airfield capacity.

There are three categories of meteorological conditions each defined by the reported cloud ceiling and flight visibility. Visual Flight Rule (VFR) conditions exist whenever the cloud ceiling is greater than 1,000 feet above ground level, and visibility is greater than three statute miles. VFR flight conditions permit pilots to approach, land, or take off by visual reference and to see and avoid other aircraft.

Instrument Flight Rule (IFR) conditions exist when the reported ceiling is less than 1,000 feet above ground level and/or visibility is less than three statute miles. Under IFR conditions pilots must rely on instruments for navigation and guidance to the runway. Other aircraft cannot be seen and safe separation between aircraft must be assured solely by following air traffic control rules and procedures. As mentioned, this leads to increased distances between aircraft which diminishes airfield capacity.

Poor Visibility Conditions (PVC) exist when the cloud ceiling and/or visibility is less than cloud ceiling and visibility minimums prescribed by the instrument approach procedures for the airport. Essentially, the airport is closed to arrivals during PVC conditions.

According to regional data, VFR conditions exist approximately 98 percent of the time, whereas IFR conditions occur the remaining 2 percent of the time.

Aircraft Mix

Aircraft mix refers to the speed, size, and flight characteristics of aircraft operating at the airport. As the mix of aircraft operating at an airport increases to include larger aircraft, airfield capacity begins to diminish. This is due to larger separation distances that must be maintained between aircraft of different speeds and sizes.

Aircraft mix for the capacity analysis is defined in terms of four aircraft classes. Classes A and B consist of single and multi-engine aircraft weighing less than 12,500 pounds. Aircraft within these classifications are primarily associated with general aviation operations, but does include some business turboprop and business jet aircraft (e.g. the Cessna Citation business jet and Beechcraft King Air). Class C consists of multi-engine aircraft weighing between 12,500 and 300,000 pounds. This is broad classification that includes business jets, turboprops, and large commercial airline aircraft. Most of the business jets in the national fleet are included within this category. Class D includes all aircraft over 300,000 pounds and includes wide-bodied and jumbo jets. A small number of aircraft within Class D currently operate and are expected to continue to operate at the airport in the future. **Exhibit 3B** depicts representative aircraft in each aircraft class.

For the capacity analysis, the percentage of Class C and D aircraft operating at the airport is critical in determining the annual service volume as this class includes the larger and faster aircraft in the operational mix. The existing and projected operational fleet mix for the airport is summarized in **Table 3B.** Consistent with projections prepared in the previous chapter, the operational fleet mix at the airport is expected to increase slightly its percentage of Class C and D through the planning period as business jet and air cargo and passenger activities increase through the planning period.

TABLE 3B
Aircraft Operational Mix

	A & B	C	D
Existing (1997)	79.1%	20.1%	0.8%
Short Term	77.3%	21.6%	1.1%
Intermediate Term	75.8%	22.9%	1.3%
Long Term	70.8%	27.9%	1.3%

Demand Characteristics

Operations, not only the total number of annual operations, but the manner in which they are conducted, have an important effect on airfield capacity. Peak operational periods, touch-and-go operations, and the percent of arrivals impact the number of annual operations that can be conducted at the airport.

• Peak Period Operations

For the airfield capacity analysis, average daily operations and average peak hour operations during the peak month is calculated. These operational levels were calculated previously in Chapter Two for existing and forecast levels of operations. Typical operational activity is important in the calculation of an airport's annual service level as "peak demand" levels occur sporadically. The peak periods used in the capacity analysis are representative of normal operational activity and can be exceeded at various times through the year.

• Touch-and-Go Operations

A touch-and-go operation involves an aircraft making a landing and an immediate take-off without coming to a full stop or exiting the runway. These operations are normally associated with training operations and are included in local operations data recorded by the air traffic control tower. For the capacity analysis, touch-and-go operations were assumed to account for 50 percent of operations during a typical peak hour.

Touch-and-go activity is counted as two operations since there is an arrival and a departure involved. A high percentage of touch-and-go traffic normally results in a higher operational capacity because one landing and one takeoff occurs within a shorter time than individual operations. Touch-and-go operations currently account for the majority of annual operations.

- **Percent Arrivals**

The percentage of arrivals as they relate to the total operations in the design hour is important in determining airfield capacity. Under most circumstances, the lower the percentage of arrivals, the higher the hourly capacity. However, except in unique circumstances, the aircraft arrival-departure split is typically 50-50. At the airport, traffic information indicated no major deviation from this pattern, and arrivals were estimated to account for 50 percent of design period operations.

CALCULATION OF ANNUAL SERVICE VOLUME

The preceding information was used in conjunction with the airfield capacity methodology developed by the FAA to determine airfield capacity for Williams Gateway Airport.

Hourly Runway Capacity

The first step in determining annual service volume involves the computation of the hourly capacity of each runway in use configuration. The percentage use of each runway, the amount of touch-and-go training activity, and the number and locations of runway exits become important factors in determining the hourly capacity of each runway configuration.

As the mix of aircraft operating at an airport changes to include a greater utilization of Class C and D aircraft, the hourly capacity of the runway system is reduced. This is because larger aircraft require longer utilization of the runway for takeoffs and landings, and because the greater approach speeds of the aircraft require increased separation. This contributes to a slight decline in the hourly capacity of the runway system over the planning period.

Annual Service Volume

Once the hourly capacity is known, the annual service volume can be determined. Annual service volume is calculated by the following equation:

Annual Service Volume = C x D x H
C = weighted hourly capacity D = ratio of annual demand to average daily demand during the peak month H = ratio of average daily demand to average peak hour demand during the peak month

Annual service volume has been calculated for two situations. First, ASV has been calculated assuming that the existing runway configuration which includes three parallel runways can be used by all of the aircraft using and expected to use the airport. The previous Master Plan included a recommendation to close the center runway and operate with the two outer parallel runways. A second calculation was prepared to examine airfield capacity in this situation.

Following this formula, the current annual service volume for Williams Gateway Airport has been estimated at 408,000 operations with three operational parallel runways. The increasing percentage of larger Class C and D aircraft over the planning period is expected to contribute to a decline in the annual service volume, lowering annual service volume with three parallel runways to a level of 365,000 operations by the end of the planning period. **Table 3C** summarizes annual service volume for the existing runway configuration of three parallel runways.

TABLE 3C
Annual Service Volume Comparison

	Annual Operations	Weighted Hourly Capacity	Annual Service Volume	Percent Capacity	Total Annual Hours of Aircraft Delay
THREE PARALLEL RUNWAYS					
Existing (1997)	186,406	175	408,000	45.7%	932
Short Term	232,200	172	398,000	58.3%	1,742
Intermediate Term	261,500	168	391,000	66.9%	2,615
Long Term	338,200	157	365,000	92.7%	8,737
TWO PARALLEL RUNWAYS					
Existing (1997)	186,406	126	294,000	63.4%	1,709
Short Term	232,200	123	284,000	81.8%	3,677
Intermediate Term	261,500	119	277,000	94.4%	6,973
Long Term	338,200	115	268,000	126.2%	28,183

Following the same formula above, a calculation of annual service volume was prepared to compare airfield capacity with two parallel runways (as recommended in the previous Master Plan) with the capacity of three parallel runways. As shown in **Table 3D**, the annual service volume with two parallel runways falls to 294,000 under existing operational and demand situations. By the end of the planning period, the annual service volume with two parallel runways is projected to be 268,000 operations.

Delay

As the number of annual aircraft operations approaches the airfield's capacity, increasing amounts of delay to aircraft operations begin to occur. Delays occur to arriving and departing aircraft in all weather conditions. Arriving aircraft delays result in aircraft holding outside of the airport traffic area. Departing aircraft delays result in aircraft holding at the runway end until released by the air traffic control tower.

Under existing conditions, with three parallel runways, total annual delay at the airport is minimal and is estimated at 932 hours. In the future, annual delay is expected to reach 8,737 hours (assuming the existing three parallel runways are available for use). With two parallel runways, annual delay can be expected to reach 28,183 hours in the long range planning horizon. **Table 3C** summarizes annual delay for each runway configuration.

Conclusion

Exhibit 3C compares annual service volume to existing and forecast operational levels for each runway configuration. The 1997 total of 186,406 operations represented 45.7% of the annual service volume with three parallel runways. By the end of the planning period total annual operations are expected to represent 92.7% of annual service volume with three parallel runways.

As evident in **Table 3C** and on the **Exhibit 3C**, by the end of the planning period, forecast operational levels could potentially exceed the annual service volume available with two parallel runways leading to increase delay.

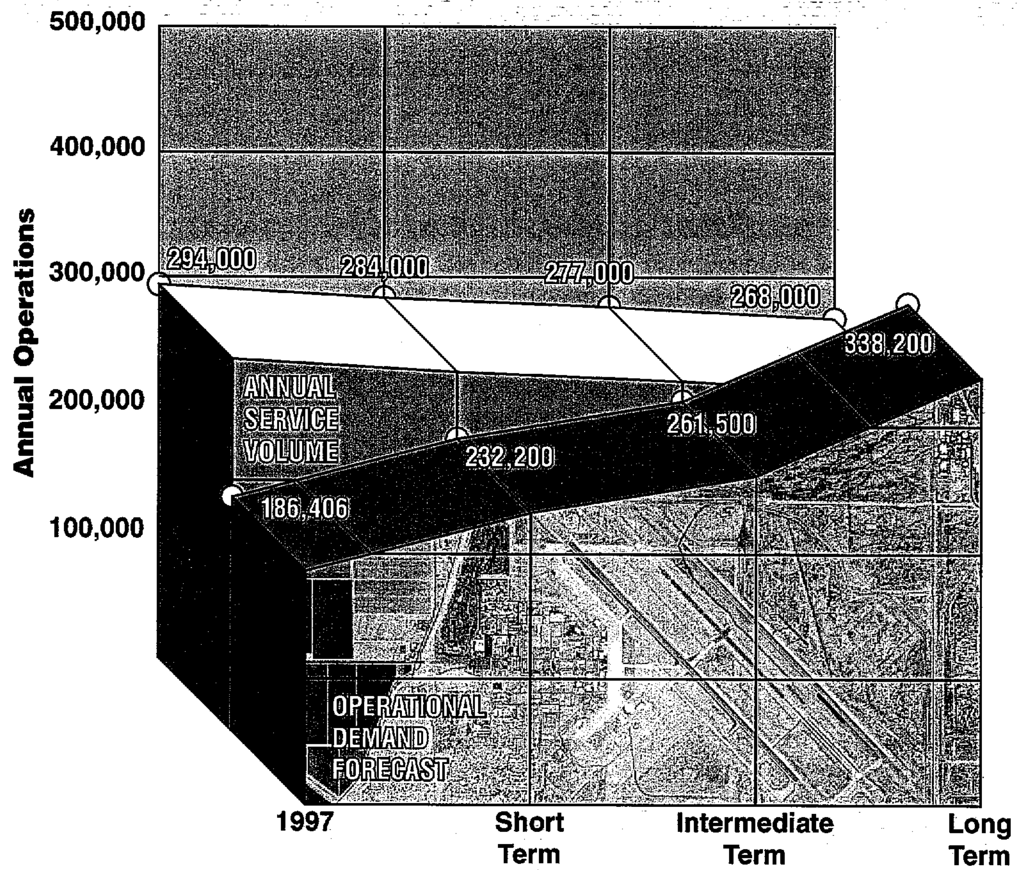
FAA Order 5090.3B, *Field Formulation of the National Plan of Integrated Airport Systems (NPIAS)*, indicates that improvements for airfield capacity purposes should be considered when operations reach 60 percent of the annual service volume. Should operations occur as forecast, the airport is expected to exceed this threshold whether two runways or three runways are maintained through the planning period. The alternatives analysis will examine the various options available for increasing capacity under each scenario.

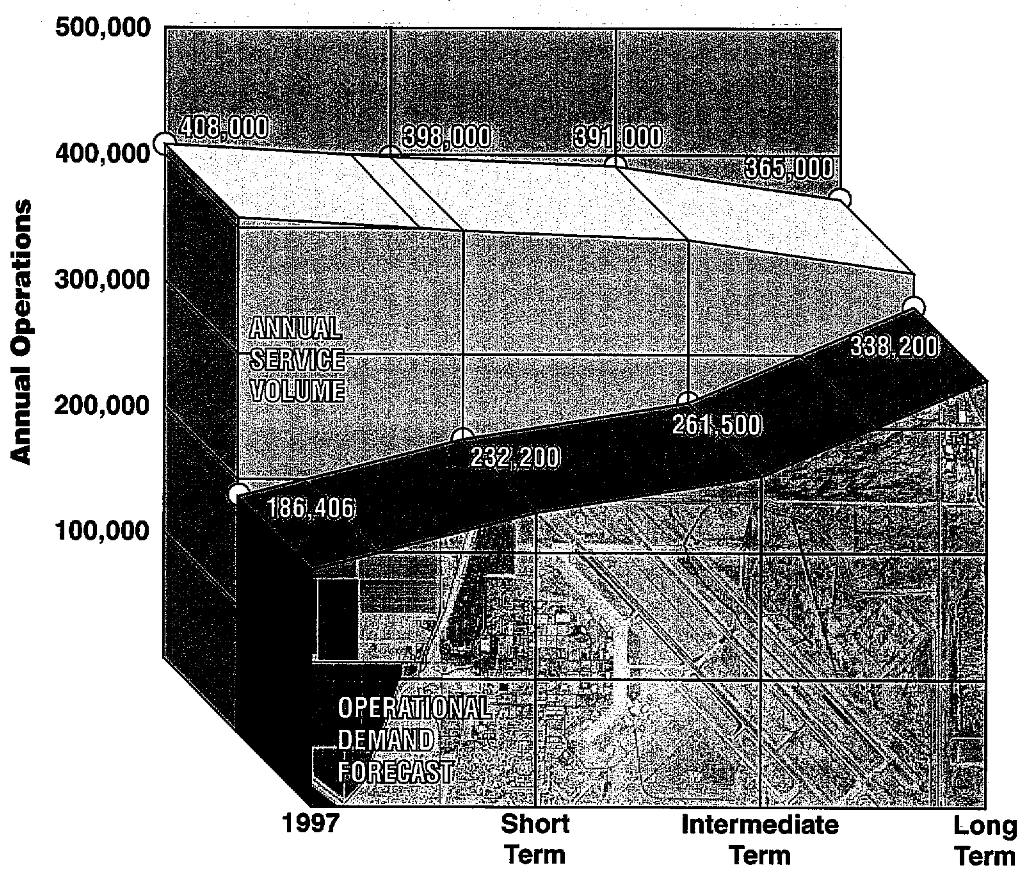
Runway Orientation

The airport is presently served by three parallel runways oriented in a north-

98MP03-3C-9/24/98

TWO PARALLEL RUNWAYS





THREE PARALLEL RUNWAYS

WILLIAMS GATEWAY AIRPORT

Exhibit 3C
DEMAND VS. CAPACITY SCENARIOS

west-southeast direction. For the operational safety and efficiency of an airport, it is desirable for the principal runway of an airport's runway system to be oriented as close as possible to the direction of the prevailing wind. This reduces the impact of wind components perpendicular to the direction of travel of an aircraft that is landing or taking off (defined as a crosswind).

FAA design standards recommend additional runway configurations when the primary runway configuration provides less than 95 percent wind coverage at specific crosswind components. The 95 percent wind coverage is computed on the basis of crosswinds not exceeding 10.5 knots for small aircraft weighing less than 12,500 pounds and from 13 to 20 knots for aircraft weighing over 12,500 pounds.

According to wind data summarized on the current Airport Layout Plan for Williams Gateway Airport, the existing parallel runway configuration provides more than 95 percent wind coverage in all crosswind conditions. Therefore, no additional runway orientations are needed to achieve minimum wind coverage at Williams Gateway Airport. **Table 3D** summarizes wind coverages for Williams Gateway Airport.

TABLE 3D
Wind Coverage Summary

	12 m.p.h/10.5 knots	15 m.p.h./13 knots	18 m.p.h/16 knots	23 m.p.h/20 knots
Runway 12-30	98.73%	99.76%	99.90%	100.00%

Source: Williams Air Force Base, 1976-1986

Runway Length

The determination of runway length requirements for an airport are based on five primary factors: airport elevation; mean maximum temperature of the hottest month; runway gradient (difference in elevation of each runway end); critical aircraft type expected to use the airport, and stage length of the longest nonstop trip destinations.

Aircraft performance declines as each of these factors increase. For Williams Gateway Airport, summertime temperatures and stage lengths of large transport aircraft are the primary factors in determining runway length requirements.

For calculating runway length requirements at Williams Gateway Airport, airport elevation is 1,380 feet above mean sea level (MSL) and the mean maximum temperature of the hottest month is 108.4 degrees Fahrenheit. Runway 12L-30R has an effective runway gradient of .27 percent, Runway 12C-30C 0.29 percent, and Runway 12R-30L .31 percent.

To determine runway length requirements for the airport, take-off runway lengths of typical transport aircraft used for air cargo and passenger services have been calculated. In calculating the runway requirements for these aircraft maximum loading (payload and fuel) has been assumed. As shown in **Table 3E**, runway length requirements vary by aircraft type and range from a low of 7,500 feet (Airbus A310) to a high as 13,900 feet for a fully-loaded Boeing 727-200.

Runway 12L-30R has been designated as the primary runway for large aircraft operation. At its present length of 9,300 feet, Runway 12L-30R falls short of fully accommodating nearly all the typical transport aircraft listed below. The Previous Master Plan examined alternatives to extend Runway 12L-30R to 12,500 feet to accommodate the take-off requirements of large transport aircraft during warm summer months. Based upon this examination of runway length requirements for aircraft which can be expected to operate at the airport in the future, a 12,500-foot runway would be able to serve the majority of these aircraft throughout most of the year. A small number of aircraft would experience payload and/or fuel limitations at this length during the warmest summer months.

TABLE 3E
Runway Length Requirements

Aircraft	Runway Length (feet)
McDonnell-Douglas DC-9-30	10,500
McDonnell-Douglas DC-9-50	10,400
McDonnell-Douglas DC-10-10	11,600
McDonnell-Douglas MD-11	13,100
McDonnell-Douglas DC-8-61	12,500
McDonnell-Douglas MD-83	10,300
Boeing 737-200	11,600
Boeing 737-300	9,500
Boeing 737-400	11,400
Boeing 737-500	10,800
Boeing 727-200	13,900
Boeing 757-200	8,900
Boeing 757-300	11,400
Boeing 767-200 ER	10,300
Boeing 767-300 ER	13,300
Boeing 747-100	10,300
Boeing 747-200	10,300
Boeing 747-400F	13,100
Airbus A300-600	9,500
Airbus A310	7,500

Source: FAA Advisory Circular 5325-4A, Runway Length Requirements for Airport Design
Aircraft Characteristics for Airport Planning (Boeing, McDonnell-Douglas, Airbus)

Runway Width

Presently, each runway at the airport is 150 feet wide. These widths are adequate for aircraft through ADG V. Therefore, no additional runway width is required to serve aircraft expected to operate at Williams Gateway Airport through the planning period. Paved shoulders should be provided for runways serving ADG IV and ADG V aircraft.

Runway Pavement Strength

The most important feature of airfield pavement is its ability to withstand repeated use by aircraft of significant weight. At the airport, this includes a wide range of military and civilian aircraft. The current strength ratings for each runway have been summarized in **Table 3F**. The critical aircraft for the design of the Runway 12L-30R pavement were DC-10 and L-1011 aircraft. These represent the largest aircraft expected to operate at the airport through the planning period. Therefore, Runway 12L-30R is expected to adequately serve the loading requirements of the largest aircraft expected to operate at Williams Gateway Airport. The pavement strength ratings for Runways 12C-30C and 12R-30L are sufficient for the mix of aircraft expected to use these runways through the planning period.

TABLE 3F
Pavement Strength Ratings (pounds)

	Runway 12L-30R	Runway 12C-30C	Runway 12R-30L
Single Wheel Loading (SW)	75,000	55,000	55,000
Dual Wheel Loading (DW)	180,000	95,000	95,000
Dual-Tandem Wheel Loading (DTW)	358,000	185,000	185,000
Double-Dual Tandem Wheel (DDTW)	N/A	550,000	550,000
DC-10-10	455,000	—	—
L-1011	490,000	—	—
B-747	850,000	—	—

TAXIWAYS

Taxiways are constructed primarily to facilitate aircraft movements to and from the runway system. Some taxiways are necessary simply to provide access between the aprons and runways, whereas other taxiways become necessary as activity increases at an airport to provide safe and efficient use of the airfield. Presently, a combination of connecting taxiways and partial parallel taxiway segments to Runway 12R-30L provide access between the apron and runways.

The current Airport Layout Plan includes several taxiway improvements to improve airfield access and provide more direct and efficient access to the runways and landside areas. The primary taxiway improvement involves developing a parallel taxiway along the east side of Runway 12L-30R to provide access to future landside development east of the runway. A second taxiway improvement involves connecting the two partial parallel taxiway segments west of Runway 12R-30L to provide parallel taxiway access the full-length of the runway. The current Airport Layout Plan also depicts the development of additional connecting and runway exit taxiways to reduce runway occupancy times and improve access between the runways and apron areas.

The location and number of exit taxiways is a factor in determining annual service volume. The alternatives analysis will examine the existing and proposed number and location of runway exit and connecting taxiways as a possible means of providing additional airfield capacity. The determination will include the optimum number and location of runway exit and connecting taxiways based upon the aircraft mix using the runway.

Taxiway width is determined by the ADG of the most demanding aircraft to use the taxiway. As mentioned previously, the most demanding aircraft to use the airfield fall within ADG V. According to FAA design standards, the minimum taxiway width for ADG V is 75 feet. Therefore, taxiways serving the runways should be constructed at a minimum width of 75 feet. Presently, taxiway widths vary from 40 feet to 150 feet. Paved taxiway shoulders should be considered for taxiways serving ADG IV and ADG V aircraft. Parallel taxiways should be located 450 feet from the runway centerline.

NAVIGATIONAL AIDS AND INSTRUMENT APPROACH PROCEDURES

A number of electronic navigational aids are in place to assist pilots in locating and landing at Williams Gateway Airport. The Willie VORTAC, Instrument Landing System, and GPS navigational aids assist pilots landing to Runway 30C during poor weather conditions when following instrument approach procedures established by the FAA.

The advent of Global Positioning System (GPS) technology will ultimately provide the airport with the capability of establishing instrument approaches to other runway ends at minimal cost since there is not a requirement for the installation and maintenance of costly ground-based transmission equipment at the airport. As mentioned previously in Chapter One, the FAA is proceeding with a program to transition from existing ground-based navigational aids to a satellite-based navigation system utilizing GPS technology. Currently, GPS is certified for enroute guidance and for use with instrument approach procedures. The initial GPS approaches being developed by the FAA provide only course guidance information. By the year 2003, it is expected that GPS approaches will also be certified for use in providing descent information for an instrument approach. As mentioned, this capability is currently only available using an Instrument Landing System.

GPS approaches fit into three categories, each based upon the desired visibility minimum of the approach. The three categories of GPS approaches are: one-half mile, three-quarter mile, and one mile. To be eligible for a GPS approach, the airport landing surface must meet specific standards as outlined in Appendix 16 of the FAA Airport Design Advisory Circular. The specific airport landing surface requirements which must be met in order to establish a GPS approach are summarized in **Table 3G**.

TABLE 3G
GPS Instrument Approach Requirements

Requirement	One-Half Mile Visibility	¾ Mile Visibility Greater Than 300-Foot Cloud Ceiling	One Mile Visibility Greater Than 400-Foot Cloud Ceiling
Minimum Runway Length	4,200 Feet	3,500 Feet	2,400 Feet
Runway Markings	Precision	Nonprecision	Visual
Runway Edge Lighting	Medium Intensity	Medium Intensity	Low Intensity
Approach Lighting	MALSR	ODALS Recommended	Not Required

Source: Appendix 16, FAA AC 150/5300-13, Airport Design, Change 5

MALSR - Medium Intensity Approach Lighting System with Runway Alignment Lighting
ODALS - Omni-directional Approach Lighting System

Presently, no runway fully meets the requirements for a one-half mile visibility GPS approach since no runway is equipped with a medium intensity approach lighting system with runway alignment lighting (MALSR) approach lighting system. However, each runway meets the requirements for three-quarter mile and one mile visibility minimum GPS approaches.

According to regional weather observations, visual weather conditions (visibility greater than three miles and cloud ceiling greater than 1,000 feet above the ground) occur nearly 98 percent of the time. Therefore, it would appear that it is not necessary to provide instrument approach capability to one-half mile standards at each runway end. Based upon the prevailing weather conditions and the costs associated with installing and maintaining approach lighting equipment, one-half mile visibility approaches should only be planned for each end of Runway 12L-30R as this runway serves as the primary runway and will be the primary runway supporting scheduled passenger and cargo operations in the future.

Instrument approach capability is not necessary for other runway ends since there is not sufficient distance between runway centerlines to conduct simultaneous instrument approaches. Presently, the FAA requires a minimum separation distance of 4,300 feet to conduct simultaneous instrument approaches. This requirement can be lowered to 3,000 feet when special radar and ground monitoring equipment is available.

The previous Master Plan recommended relocating the ILS from Runway 30C to 30R to position the ILS with the primary runway. The WGAA should monitor the progress of GPS improvements to determine whether a relocation of the ILS is necessary or whether GPS advancements will allow for the ILS to be decommissioned and replaced with GPS approaches.

LIGHTING AND MARKING

Currently, there are a number of lighting and pavement marking aids serving pilots and aircraft using the Williams Gateway Airport. These lighting and marking aids assist pilots in locating the airport during night or poor weather conditions, as well as assist in the ground movement of aircraft.

Runway markings are designed according to the type of instrument approach available on the runway. FAA AC 150/5340-1F, *Marking of Paved Areas on Airports*, provides the guidance necessary to design an airport's markings.

Each runway at Williams Gateway Airport has precision runway markings. The precision marking to 12L-30R are sufficient for an ILS or GPS instrument approach to Runways 12L and 30R. The remaining markings are sufficient for the visual approaches to each runway end and should be maintained through the planning period.

Taxiway and apron areas also require marking to assure that aircraft remain on the pavement. Yellow centerline stripes are currently painted on all taxiway and apron surfaces at the airport to provide this guidance to pilots. Aircraft parking positions are also marked on each apron area. Besides routine maintenance, these markings will be sufficient through the planning period.

Airport lighting systems provide critical guidance to pilots during nighttime and low visibility operations. Runways 12C-30C and 12R-30L are equipped with medium intensity runway lighting. High intensity runway lighting (HIRL) is being installed to Runway 12L-30R. These systems are sufficient and should be maintained through the planning period.

Effective ground movement of aircraft at night is enhanced by the availability of taxiway lighting. With the exception of portions of Taxiways K and L, all taxiways are equipped with medium intensity pavement edge lighting. These lighting systems are sufficient and should be maintained through the planning period.

The airport is equipped with a rotating beacon to assist pilots in locating the airport at night. A new rotating beacon is being installed on the top of the airport traffic control tower to replace an aging rotating beacon located on the water tower west of the airfield. The new rotating beacon provides improved visibility and should be adequate through the planning period.

In most instances, the landing phase of any flight must be conducted in visual conditions. To provide pilots with visual guidance information during landings to the runway, visual glideslope indicators (VGSI's) are commonly provided at airports. Presently, the only VGSI system available at the airport are the precision approach path indicators (PAPIs) installed at the Runway 12C, 12L, 30R, and 30C ends. Facility planning should include installing similar systems at the Runway 12R and 30L ends.

Approach lighting systems provide the basic means to transition from instrument flight to visual flight for landing. A medium intensity approach lighting system with runway alignment lighting (MALSR) is required for one-half mile visibility minimum instrument landing system and global positioning system instrument approach procedures. Facility planning should include the installation of a MALSR system to each end of Runway 12L-30R to support a future one-half mile visibility ILS/GPS approach procedures to each runway end.

Runway identification signage was installed in 1998. These lighting aids assist pilots in locating their position on the airfield. These lighting aids are sufficient for existing operations and should be maintained through the planning period. Additional signage may be needed as new taxiways are constructed at the airport.

CONCLUSIONS

A summary of the airfield facility requirements is presented on **Exhibit 3D**. Consideration should be given to extending Runway 12L-30R to 12,500 feet to serve large transport aircraft takeoff requirements. The existing runway orientations, widths, and strengths are sufficient to serve the expected mix of aircraft through the planning period. Ultimately, GPS approaches with one-half mile visibility minimums should be established to each end of Runway 12L-30R. VGSIs installed at the Runway 12L, 12R, 30L, and 30R ends would enhance visual operations to these runways. A MALSR approach lighting system is required at the Runway 12L and 30R ends to ensure that the lowest visibility and cloud ceilings can be established for future instrument approaches to each runway end.

LANDSIDE REQUIREMENTS

Landside facilities are those necessary for handling of aircraft, passengers, and freight while on the ground. These facilities provide the essential interface between the air and ground transportation modes. The capacities of the various components of each area were examined in relation to projected demand to identify future landside facility needs.

TERMINAL AREA REQUIREMENTS

Components of the terminal area complex include the terminal apron, vehicle parking area, and the various functional elements within the terminal building. This section identifies the terminal area facilities required to meet the airport's needs through the planning period.

Presently, there is not a passenger terminal building at the airport. The WGAA is converting Building 15 to serve as an interim passenger terminal building. Presently, the airport is not served by any scheduled passenger service. As discussed previously in Chapter Two, the establishment of passenger service is expected during the planning period. This is expected to begin with charter activities with scheduled passenger service added gradually through the planning period.

The requirements for the various terminal complex functional areas were determined with the guidance of FAA Advisory Circulars 150/5360-9, *Planning and Design of Airport Terminal Facilities at Nonhub Locations*, and 150/5360-13, *Planning and Design Guidelines for Airport Terminal Facilities*. The consultant's database for space requirements was also considered.

Facility requirements were developed for the planning period based upon the forecast enplanement levels. It should be noted that actual need for construction of facilities will be based upon enplanement levels rather than a forecast year.

Exhibit 3E summarizes passenger terminal building functional area requirements for forecast enplanement levels. The various functional areas of the terminal building are summarized as follows:

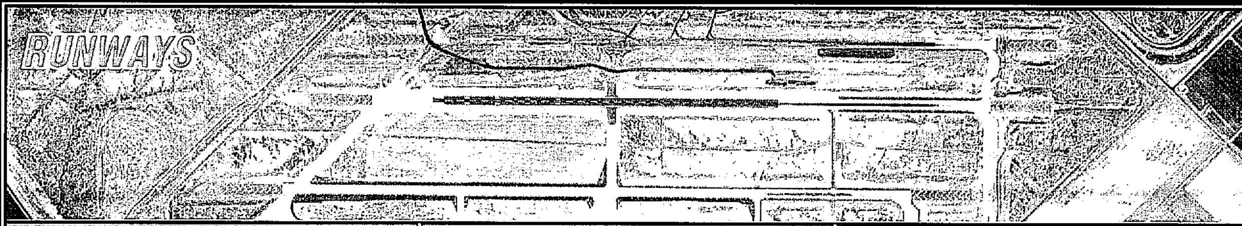
- **Ticketing** - includes estimates of the space necessary for the queuing of passengers at ticket counters, the liner foot of ticket counters, and the space necessary to accommodate baggage make-up and airline ticket offices.

- **Departure Facilities** - includes estimates of the space necessary for departure holdrooms and the number of aircraft gate positions. It should be noted that exclusive use gate arrangements usually generate a need for additional holdrooms and gate positions since gate area cannot be used by more than one airline. Therefore, holdroom space and gate positions in excess of the requirements presented on the exhibit may be necessary to accommodate individual airline demand.

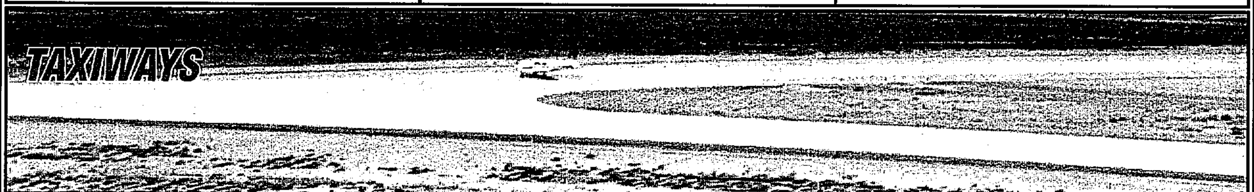
- **Baggage Claim** - includes estimates of the linear feet of baggage claim needed and space for passengers to claim baggage.

- **Rental Cars** - includes estimates of space necessary for the queuing of passengers at rental car counters, the space necessary for rental car offices, and the linear foot for rental car counters.

98MP03-3D-9/8/99

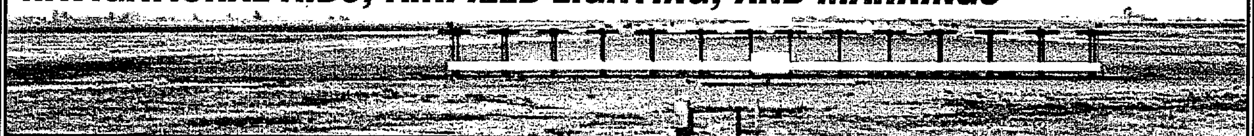


EXISTING	SHORT TERM NEED (5 years)	LONG TERM NEED (10-20 years)
Runway 12L-30R 9,301' x 150' 75,000 SW, 358,000 DTW, 455,000 DC-10-10 180,000 DW, 490,000 L-1011, 850,000 B-747	**Runway 12L-30R** Same	**Runway 12L-30R** Extend to 12,500 feet
Runway 12C-30C 10,201' x 150' 55,000 SW, 95,000 DW 185,000 DTW, 550,000 DDTW	**Runway 12C-30C** Same	**Runway 12C-30C** Re-evaluate previous recommendations to close
Runway 12R-30L 10,401' x 150' 55,000 SW, 95,000 DW 185,000 DTW, 550,000 DDTW	**Runway 12R-30L** Same	**Runway 12R-30L** Same



EXISTING	SHORT TERM NEED (5 years)	LONG TERM NEED (10-20 years)
Partial parallel taxiway segments connecting taxiways	Connecting Taxiways	Connecting Taxiways, Parallel Taxiway East of Runway 12L-30R

NAVIGATIONAL AIDS, AIRFIELD LIGHTING, AND MARKINGS

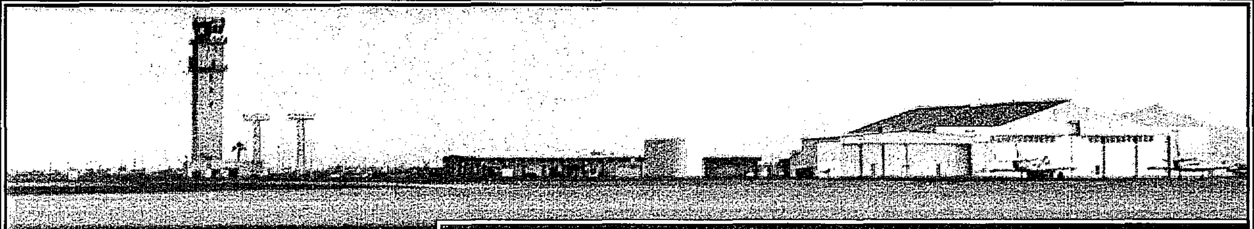


EXISTING	SHORT TERM NEED (5 years)	LONG TERM NEED (10-20 years)
Rotating Beacon	Same	Same
PAPI (12L, 30R and 12C, 30C)	VGSI (12R, 30L)	Same
VORTAC, GPS, ILS Instrument Approach Procedures to Runway 30C	Same	GPS/ILS Instrument Approach Procedures to Runways 12L, 30R One-mile GPS (12R-30L)
High Intensity Runway Lighting Runway 12L-30R	Same	Same
Medium Intensity Runway Lighting Runways 12C-30C, 12R-30L	Same	Same
Medium Intensity Taxiway Lighting	Same	Same
Precision Runway Markings	Same	Same
Lighted Airfield Signs	Same	Same
MALSR 30C	Same	MALSR (12L, 30R)

WILLIAMS GATEWAY AIRPORT

Exhibit 3D
AIRFIELD REQUIREMENTS

98MP03-3E-9/8/99



	ENPLANEMENTS				
	100,000	250,000	650,000	1,200,000	2,000,000
TICKETING					
Counter Length (l.f.)	34	74	169	268	298
Counter Area (s.f.)	342	744	1,693	2,680	2,977
Ticket Lobby (s.f.)	683	1,487	3,386	5,360	5,954
Airline Operations/Bag Make-up (s.f.)	2,540	5,360	10,650	16,130	18,560
DEPARTURE FACILITIES					
Aircraft Gates	1	2	4	7	12
Holdroom Area (s.f.)	6,181	13,453	30,623	48,480	53,853
BAGGAGE CLAIM					
Claim Display (l.f.)	115	250	569	900	1,000
Baggage Claim Lobby (s.f.)	5,095	11,089	25,241	39,960	44,389
TERMINAL SERVICES					
Rental Car					
Counter Length (l.f.)	39	85	193	306	340
Office Area (s.f.)	780	1,698	3,866	6,120	6,798
Lobby (s.f.)	234	509	1,160	1,836	2,039
Food/Beverage (s.f.)	3,091	6,727	15,312	24,240	26,927
Retail (s.f.)	850	1,850	4,211	6,666	7,405
Restrooms (s.f.)	1,424	2,746	5,867	9,113	10,090
PUBLIC LOBBY					
Greeting/Farewell Area (s.f.)	2,405	5,235	11,916	18,864	20,955
SECURITY SCREENING					
Security Stations	1	2	5	8	9
Security Equipment Area (s.f.)	177	385	876	1,387	1,541
Security Offices (s.f.)	104	226	515	816	906
SUBTOTAL PROGRAMMED AREA	**24,308**	**52,384**	**117,306**	**184,803**	**205,895**
General Circulation, Mechanical/ Electrical, Maintenance & Storage (s.f.)	8,654	18,649	41,761	65,790	73,298
TOTAL TERMINAL AREA	**32,961**	**71,032**	**159,067**	**250,593**	**279,193**
[illegible]					
Public					
Short Term	131	285	649	1,028	1,142
Long Term	250	625	1,625	3,000	4,667
Rental Car	56	139	361	667	1,111
Employee	50	125	260	360	400
TERMINAL CURB AND TERMINAL APRON					
Length (l.f.)	298	649	1,478	2,340	2,599
Terminal Apron (s.y.)	8,800	17,600	35,200	61,600	105,600

WILLIAMS GATEWAY AIRPORT

Exhibit 3E
PASSENGER TERMINAL BUILDING REQUIREMENTS

- **Concessions** - includes estimates of the space necessary to provide adequate concession services such as restaurant and retail facilities.

- **Security Screening** - include estimates of the amount of space to accommodate passenger screening devices, the queuing of passengers, and security offices.

- **Public Waiting Lobby** - includes estimates of the amount of space to accommodate arriving and departing passengers.

- **Terminal Apron** - The terminal apron consists of the area and facilities used for aircraft gate parking and aircraft support and servicing operations. Terminal apron area was estimated by providing 8,800 square yards of apron for each gate position to account for large transport aircraft expected to serve the airport in future. In addition to actual gate positions, sufficient room must be provided for aircraft servicing, taxilanes leading to the airfield, and service/fire lanes designated for vehicles used for aircraft ground servicing and fire equipment. The location of the apron in relation to the airfield and configuration of the terminal building will determine the need for taxiways and areas for ground support equipment and should be included in the final design of the terminal apron.

- **Terminal area automobile parking** - includes of the number of parking spaces required for long-term and short-term public parking, terminal employee parking, and rental car space. A gross area requirement is also presented to assist in development planning.

- **Terminal curb frontage** - includes an estimate of the linear feet of curb required to accommodate the queuing of enplaning and deplaning passenger vehicles.

The gross terminal building area includes factors for circulation and mechanical systems. While these estimates provide reasonable planning guidelines, specific airline requirements should be incorporated in the actual design of terminal building functional areas when available.

AIR CARGO REQUIREMENTS

The two primary cargo-related facilities requiring analysis include the cargo apron and building space. Presently, there is no single building or facility dedicated solely to air cargo on the airport. Facility needs are being met in several areas on the airport. Air cargo is presently transferred directly from aircraft to vehicles on the middle apron area. Hazardous cargo is handled on a taxiway east of Runway 12L-30R (currently under reconstruction).

The space requirements of aircraft commonly used for the transport of air cargo were used to develop air cargo ramp requirements. A Boeing 727-200 requires approximately 5,900 square yards of apron while aircraft such as a Boeing 757, Boeing 767, McDonnell-Douglas DC-8, and Airbus A300-600 require approximately 8,800 square yards of apron. A planning standard of 700 square yards of apron was used to determine feeder aircraft (i.e. Cessna Caravan) apron requirements.

The projection of future apron requirements assumes two feeder aircraft and one jet aircraft (727) in the short term planning period, two jet aircraft (two 727) and two feeder aircraft in the intermediate planning horizon, and three jet (two 727, one 757) aircraft and four feeder aircraft in the long term planning horizon.

An industry planning standard of 500 pounds of enplaned cargo per square foot was used to determine building space requirements. **Exhibit 3F** summarizes air cargo apron and building requirements through the planning period.

GENERAL AVIATION REQUIREMENTS

This section will evaluate the space requirements for general aviation hangars and apron. Currently aircraft storage and maintenance is being met through the use of large shade and conventional hangars which can accommodate multiple aircraft simultaneously. Presently, general aviation facilities are located in separate areas of the airport.

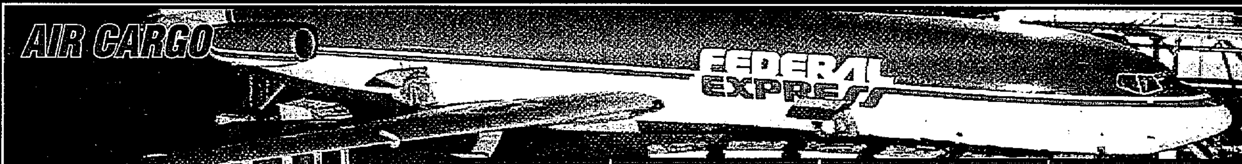
Utilization of hangar space varies as a function of local climate, security, and owner preferences. The trend in general aviation aircraft, whether single or multi-engine, is in more sophisticated (and consequently more expensive) aircraft. Therefore, many hangar owners prefer hangar space to outside tiedowns.

Future hangar requirements for the airport are summarized on **Exhibit 3F**. A planning standard of 1,200 square feet per based aircraft stored in T-hangars has been used to determine future T-hangar requirements. A planning standard of 2,500 square feet for large aircraft stored in conventional hangars has been used to determine future conventional hangar requirements. Conventional hangar area was increased by 15 percent to account for future aircraft maintenance needs.

A parking apron should be provided for at least the number of locally-based aircraft that are not stored in hangars, as well as transient aircraft. Approximately 41 tiedowns are available for transient and based aircraft at the airport. However, the airport has the capability to add additional tiedown locations as demand warrants. Although the majority of future based aircraft were assumed to be stored in an enclosed hangar, a number of based aircraft will still tiedown outside. Total apron area requirements were determined by applying a planning criterion of 700 square yards per transient aircraft parking position and 500 square yards for each locally-based aircraft parking position. The results of this analysis are presented on **Exhibit 3F**.

98MP03-3F-12/1/99

AIR CARGO

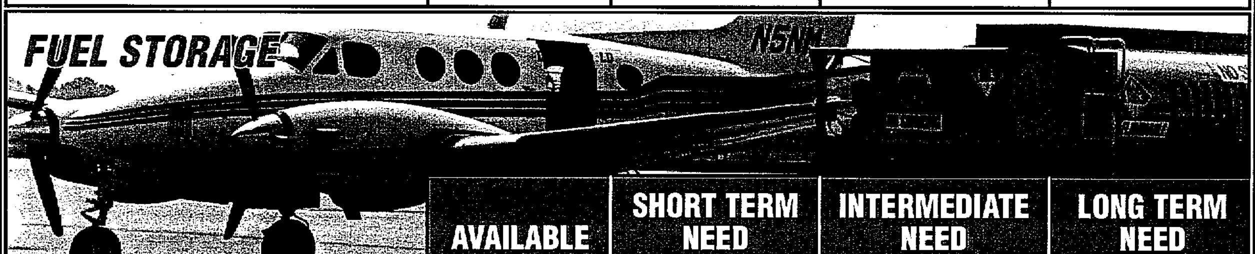


	AVAILABLE	SHORT TERM NEED	INTERMEDIATE NEED	LONG TERM NEED
Building Space (s.f.)	---	24,700	32,900	49,300
Apron Area (s.y.)	---	7,300	13,200	23,400

GENERAL AVIATION

	AVAILABLE	SHORT TERM NEED	INTERMEDIATE NEED	LONG TERM NEED
Aircraft Storage Hangars				
T-hangar Positions	0	29	50	95
Conventional Hangar Positions	8-15	36	50	81
T-hangar Area (s.f.)	0	34,800	60,000	114,000
Conventional Hangar Area (s.f.)	22,500	106,000	146,300	235,400
Total Hangar Area (s.f.)	22,500 *	140,800	206,300	349,400
** Hangar 37*				
Apron Area				
Transient Apron Positions	---	36	40	48
Locally-Based Aircraft Positions	---	35	35	34
Total Positions	41	71	75	82
Total Apron Area (s.y.)	88,700 *	51,500	54,400	60,500
** North Apron*				
Terminal Facilities				
Building Space	---	4,300	5,000	6,600
Vehicle Parking				
Terminal Vehicle Spaces	---	62	72	96
General Aviation Spaces	---	47	75	136
Total Parking Spaces	---	109	147	231
Total Parking Area (s.f.)	---	43,600	58,700	92,500

FUEL STORAGE



	AVAILABLE	SHORT TERM NEED	INTERMEDIATE NEED	LONG TERM NEED
Bi-Weekly Storage Requirements				
100LL AVGAS	4,000	11,850	17,450	31,600
Jet-A	50,000	151,250	250,050	601,750
Total Fuel Storage	54,000	163,100	267,500	633,350

WILLIAMS GATEWAY AIRPORT

Exhibit 3F
AIR CARGO, GENERAL AVIATION
AND FUEL STORAGE REQUIREMENTS

General aviation terminal building space is required for waiting passengers, pilot's lounge and flight planning, concessions, management, storage, and various other needs. This space is not necessarily limited to a single, separate terminal building but also includes the space offered by fixed base operators for these functions and services. Building 19 currently serves as the general aviation terminal by providing space for flight planning and a pilot's lounge.

The methodology used in estimating general aviation terminal facility needs was based on the number of airport users expected to utilize general aviation facilities during a typical design hour. **Exhibit 3F** outlines requirements for general aviation terminal services at the airport through the planning period.

Public vehicle parking is located adjacent to each existing building and hangar on the airport. In the future, vehicle parking will be required adjacent to new hangar development and general aviation terminal facilities. Vehicle parking requirements for future terminal facilities have been determined utilizing a planning standard of 1.3 spaces per design hour passenger and 400 square feet for each parking position (to account for drive lanes). Vehicle parking requirements for hangars and other aviation facilities at the airport were determined as a percentage of based aircraft utilizing the same multiplier described above. **Exhibit 3F** outlines vehicle parking requirements for the airport.

SUPPORT REQUIREMENTS

Various facilities that do not logically fall within classifications of airfield, terminal building, air cargo or general aviation areas have also been identified. These other areas provide certain functions related to the overall operation and safety of the airport and include: aircraft rescue and firefighting, fuel storage, and airport maintenance.

AIRCRAFT RESCUE AND FIREFIGHTING

Requirements for Airport Rescue and Firefighting (ARFF) services at an airport are established under Federal Aviation Regulations (FAR) Part 139. FAR Part 139 applies to the certification and operation of land airports serving air carriers having a seating capacity of more than 30 seats. Paragraph 139.315 of Subpart D of FAR Part 139 regulations establishes an ARFF index determination. This index rating is based on the number of departures conducted by passenger aircraft having at least 30 seats within a specific category. Williams Gateway Airport currently meets the requirements for ARFF Index B. In this capacity, Williams Gateway Airport can serve five daily departures of commercial airline aircraft up to 126 feet in length, such as the Boeing 737 and earlier McDonnell-Douglas DC-9-10 and 30 series aircraft.

The next higher index rating (Index C) includes aircraft at least 126 feet but less than 159 feet in length. This includes aircraft such as the Boeing 727-200, Boeing 757, Boeing 767 and McDonnell Douglas DC-9-50, and MD-80 series.

As described in the previous chapter, the airport may be served by passenger aircraft such as the McDonnell-Douglas DC-10 providing charter services at the airport. This aircraft falls within ARFF index D. This is expected to be the highest ARFF requirement for Williams Gateway Airport through the planning period as this is the largest category of aircraft expected to be used in commercial air service at Williams Gateway Airport.

The WGAA will purchase an additional ARFF vehicle in 1999 which will provide an additional 1,500 gallon storage capability. Combined with existing ARFF vehicles, the airport will meet ARFF index C requirements once this vehicle is acquired.

To meet ARFF index D, the WGAA will need to acquire additional vehicles. In anticipating of potential air service, the WGAA has included the acquisition of an additional ARFF vehicle in Fiscal Year 2000 with an FAA grant. As programmed, the acquisition of this ARFF vehicle (3,000 gallon capacity) would increase the airport's ARFF index to index D.

FUEL STORAGE

Fuel storage needs at the airport are met with a combination of above ground storage tanks and mobile fuel trucks. A mobile fuel truck provides the only 100LL AVGAS storage and has a 4,000 gallon capacity. Jet-A is stored in two 25,000 gallon above ground fuel storage tanks.

Exhibit 3F summarizes fuel storage requirements through the planning period based on estimated monthly fuel usage and maintaining a two-week supply of fuel.

AIRCRAFT OWNER MAINTENANCE AND AIRCRAFT WASH FACILITY

Presently, a number of airports are constructing or considering the development of an aircraft owner maintenance facility and wash bay to meet tougher environmental regulations. These areas typically provide for the collection of used aircraft oil and other hazardous materials and provide a covered area for aircraft washing and light maintenance. Presently, aircraft owners can wash their aircraft at Hangar 37. The development of a facility such as this should be considered in facility planning as a means to reduce environmental exposure to the WGAA. A facility of this type also provides a revenue source for the Airport Authority which can be used to help amortize a portion of the development costs of such a facility.

AIRPORT MAINTENANCE FACILITY

WGAA airfield, vehicle, and building maintenance operate from Building 1080 located south of the ATCT. Building 1080 was constructed in 1980 and is approximately 23,456 square feet in size. A site plan was recently completed to identify the long term use and configuration of the maintenance building and maintenance yard. The site plan includes fencing the entire area and the development of a separate 10,000 square-foot vehicle maintenance building, a fuel island and wash rack, and 138 spaces for employee automobile and maintenance equipment parking and storage.

UTILITIES

Electrical, telephone, water, sanitary sewer, and natural gas services are available at the airport. These systems are original military equipment and are in need of upgrading and/or replacement. Current plans include the installation of new utility lines concurrent with the Ray Road and Sossaman Road construction to accommodate future needs on the west side of the airport. Future development on the east side of the airport will require the installation of all primary utility lines.

SUMMARY

The intent of this chapter has been to outline the facilities required to meet potential aviation demands projected for Williams Gateway Airport through the planning horizon. The next step is to develop a direction for development to best meet these projected needs. The remainder of the master plan will be devoted to outlining this direction, its schedule, and costs.